The Use of a Gauze-Based Negative Pressure Wound Therapy (NPWT) System to Assist Wound Closure

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Introduction & Aim

Serious complications may result when chronic wounds persist. Therefore it is important to hasten the healing and closure of such wounds. Three patients with chronic wounds were selected and treated with a gauze-based NPWT* system to assist granulation tissue formation and wound closure. The aim was to clinically evaluate the efficacy of a NPWT system*, namely sufficient granulation tissue formation and decrease all wound depths using gauze dressings in combination with negative pressure wound therapy on various chronic wounds.

Methods

CSI previously utilized a foam-based NPWT system. In the present case series, the evaluation of the gauze-based Invia® NPWT system* was undertaken. Prior to NPWT therapy the wounds were debrided and freed of necrotic and sloughy tissues. A clinical follow-up was carried out centered on the improvement of the wound, patient satisfaction and the use of the Invia® Liberty pump** and materials by the nursing staff. An -80 mmHg pressure was used, a recommended therapy value given by the manufacturer. The therapy was kept on a continuous mode. Wound dressings consisted of gauze-based* NPWT dressing and were replaced 2-3 times a week with regards to wound evaluations. Standard wound evaluation and measurements (length, width and depth) were performed on patients.

Invia® Wound Therapy* System Dressing Protocol

– Skin prepped with skin sealant
– Applied saline to wound bed
– Placed saline moistened AMD™*** gauze and silicon drain in wound bed
– Sealed with occlusive dressing
– Therapy remained between -60 to -80mmHg continuous
– Dressing changes performed every 48 to 72 hours

Conclusions

Both the nursing and medical teams as well as the patients were satisfied with the Invia® Wound Therapy*. The elements particularly appreciated were the:
– complete wound care kits provided for the therapy with adapted materials
– facility to install, program and use the pump** (no unjustified alarms)
– small volume needed to stock the materials
– little noise of the pump at a working capacity at night and during the day
– easy bed and wheelchair support fixation system
– light weight of the whole system for the patient
– pump transportation shoulder bag's ease of use and good battery life.
– ease of dressing changes and decreased amount of nursing time to change dressing

All the wounds responded well with the applied gauze-based NPWT* treatment in all three patients. Upon dressing change, patients experienced minimal amount of pain. We provide evidence that gauze-based NPWT* assisted in decreasing the wound size and facilitated granulation tissue formation in chronic and complicated wounds. In the case where skin grafting was required, both wound bed perfusion and improved graft uptake was clearly evident.

Notes:
* Invia® Wound Therapy for NPWT, Medela Inc., Chicago, U.S.A.
** Invia® Liberty, Medela Inc., Chicago, U.S.A.
*** AMD™ is a trademark of Tyco Healthcare Group, LP.
**** PROMOGRAN PRISMA™ is a trademark of Systagenix Wound Management Inc., U.S.A.

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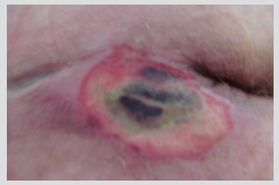
Case Description: Patient 1
98 year old malnourished male with non-healing pressure ulcers residing in a nursing home with a history of ischemic stroke, right sided hemiplegia, and disarthria. Patient is on pressure relief mattress.

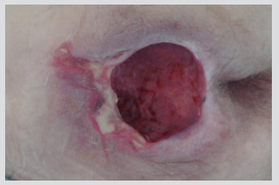
Wound 1:
Sacral pressure ulcer, 6cm X 5.5cm fibrinous, necrotic, with bone exposure.
Following 3 weeks of NPWT no fibrin or necrosis evident and bone is no longer visible.
NPWT discontinued due to severe diarrhea.

– At the end of NPWT treatment, the medical condition of the patient along with his wounds improved greatly and consequently his nutritional status returned to normal.

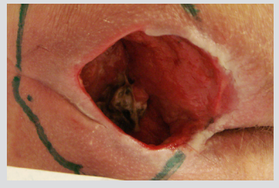
Figure 1
Patient 1; Sacral wound: Before and after pictures comparing visual characteristics of the wounds before and prior to initiation of gauze-based NPWT (Invia® Wound Therapy System*)



A) Unexplored sacral pressure ulcer, with deep tissue injury prior to eruption

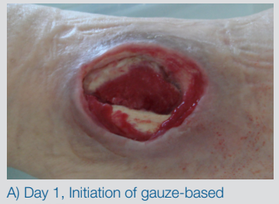


C) Day 21, Gauzed-based NPWT* discontinued



B) Sacral pressure sore, with bone visible

Figure 2
Patient 1; Leg wound: Before and after pictures comparing visual characteristics of the wounds before and prior to initiation of gauze-based NPWT (Invia® Wound Therapy System*)



A) Day 1, Initiation of gauze-based NPWT* treatment

B) Day 21, Gauze-based NPWT* treatment discontinued

Case Description: Patient 2
87 year old female nursing home patient with Stage III sacral pressure ulcer. Patient has a history of left sided hemiparesis, incontinent of urine, poor nutrition, and depression with a Braden scale of 12. Initial interventions of nutritional support including protein, vitamin supplements, and sufficient hydration along with regular turning measures and pressure relieving surface were began.

Stage III Sacral Pressure Ulcer:
Initial management of debridement and topical therapy with advanced wound care dressings for 15 days occurred. To ensure more rapid granulation NPWT was initiated.

– Wound assessment at start of NPWT: 5cm X 5cm X 3cm depth with 1.5cm undermining. Small amount of slough.

– Following 10 days of gauze-based NPWT*, diminished volume was noted in undermined area of wound. NPWT continued for 49 days until granulation reached the level of the skin and therapy was discontinued. Management of the wound continued with an epithelialisation therapy**** until complete closure.

Figure 3
Patient 2; Sacral wound: Before and after pictures comparing visual characteristics of the wounds before and prior to initiation of gauze-based NPWT (Invia® Wound Therapy System*)

A) Day 1, Post debridement, and initiation of gauze-based NPWT* treatment for a stage III sacral pressure ulcer (18 May 2009)

B) Patient follow up, post gauze-based NPWT* treatment and epithelialisation therapy**** (14 Oct. 2009)

Case Description: Patient 3
65 year old female nursing home patient with open ulcer on right tibia with bone exposure and long standing history of recurring osteomyelitis of right leg since 1950. Patient is a smoker with history of hypertension.

Right Tibial Ulcer:
– Wound managed with topical advanced wound dressing and debridement.

– Heavy contamination of MRSA and pseudomonas was noted and a 3 month course of antibiotics was started and initiation of Invia® Wound Therapy* for NPWT for optimization of wound bed for grafting.

– Wound grafted and Invia® Wound Therapy* continued post grafting procedure.

Figure 4
Patient 3; Skin graft preparation: Before and after pictures comparing visual characteristics of the wounds before and prior to initiation of gauze-based NPWT (Invia® Wound Therapy System*) for wound bed preparation for grafting.

A) Bone is exposed

C) Day 16 (Dec. 26, 2008) (Post wound cleansing and gauze-based NPWT* dressing change)

B) Day 1, leg wound, initiated on NPWT in preparation for skin grafting (10 Dec. 2008)

D) Day 26 (Jan. 05, 2009) (Post wound cleansing and gauze-based NPWT* dressing change)

Figure 5
Patient 3; Skin graft and NPWT: Before and after pictures comparing visual characteristics of the wounds before and prior to initiation of gauze-based NPWT (Invia® Wound Therapy System*) for improved graft uptake

A) Day 1, Skin graft applied, initiated on NPWT to aid skin graft uptake (20 Feb. 2009)

C) Day 3, Post gauze-based NPWT* dressing change, progression of skin graft (23 Feb. 2009)

B) Day 1, A non-adherent dressing applied on top of the skin graft, and then gauze-based NPWT* (20 Feb. 2009)

D) Patient follow up (1 year post NPWT* treatment)